

## Federal Railroad Administration, DOT

## Pt. 229, App. D

| Section   | Violation | Willful violation |
|---|-----------|-------------------|
| (c) Occupied unit in switching, transfer service, in trailing position not sanitary .....         | 2,500     | 5,000             |
| (d) Defective unit used more than 10 days .....   | 2,500     | 5,000             |
| (e) Failure to repair defective modesty lock .....  | 1,000     | 2,000             |
| <b>Subpart D—Locomotive Crashworthiness Design Requirements</b>                                   |           |                   |
| 229.205 General requirements:   |           |                   |
| (a)(1) Wide-nose locomotive not designed in compliance with AAR S-580-2005 .....                  | \$5,000   | \$7,500           |
| (2) Wide-nose locomotive not designed in compliance with new approved design standard .....       | 5,000     | 7,500             |
| (3) Wide-nose locomotive not designed in compliance with alternate approved design standard ..... | 5,000     | 7,500             |
| (b) Monocoque or semi-monocoque locomotive not in compliance with design requirements .....       | 5,000     | 7,500             |
| (c) Narrow-nose not in compliance with design requirements .....                                  | 5,000     | 7,500             |
| 229.206 Design requirements:  |           |                   |
| Locomotive fails to meet—   |           |                   |
| (1) Emergency egress requirements .....   | 2,500     | 5,000             |
| (2) Emergency interior lighting requirements .....  | 2,500     | 5,000             |
| (3) Interior configuration requirements .....   | 2,500     | 5,000             |
| 229.213 Locomotive manufacturing information:   |           |                   |
| (a) Failure to retain required information .....  | 2,500     | 5,000             |
| (b) Failure to produce required information .....   | 2,500     | 5,000             |
| 229.215 Retention and inspection of designs:  |           |                   |
| (a) Failure to retain required design records .....   | 2,500     | 5,000             |
| (b) Failure to retain required repair or modification records .....                               | 2,500     | 5,000             |
| (c) Failure to make records available when requested .....  | 2,500     | 5,000             |
| 229.217 Fuel tank:  |           |                   |
| (a) External fuel tank .....  | 5,000     | 7,500             |
| (b) Internal fuel tank .....  | 5,000     | 7,500             |

<sup>1</sup> A penalty may be assessed against an individual only for a willful violation. Generally, when two or more violations of these regulations are discovered with respect to a single locomotive that is used by a railroad, the appropriate penalties set forth above are aggregated up to a maximum of \$16,000 per day. However, a failure to perform, with respect to a particular locomotive, any of the inspections and tests required under subpart B of this part will be treated as a violation separate and distinct from, and in addition to, any substantive violative conditions found on that locomotive. Moreover, the Administrator reserves the right to assess a penalty of up to \$100,000 for any violation where circumstances warrant. See 49 CFR part 209, appendix A.

Failure to observe any condition for movement set forth in § 229.9 will deprive the railroad of the benefit of the movement-for-repair provision and make the railroad and any responsible individuals liable for penalty under the particular regulatory section(s) concerning the substantive defect(s) present on the locomotive at the time of movement. Failure to comply with § 229.19 will result in the lapse of any affected waiver.

[53 FR 52931, Dec. 29, 1988, as amended at 58 FR 36615, July 8, 1993; 61 FR 8888, Mar. 6, 1996; 63 FR 11622, Mar. 10, 1998; 67 FR 16052, Apr. 4, 2002; 69 FR 30594, May 28, 2004; 70 FR 21920, Apr. 27, 2005; 70 FR 37942, June 30, 2005; 71 FR 36915, June 28, 2006; 71 FR 47667, Aug. 17, 2006; 71 FR 63136, Oct. 27, 2006; 72 FR 51197, Sept. 6, 2007; 73 FR 79703, Dec. 30, 2008]

#### APPENDIX C TO PART 229—FRA LOCOMOTIVE STANDARDS—CODE OF DEFECTS

EDITORIAL NOTE: Appendix C, published at 45 FR 21121, Mar. 31, 1980, as part of the original document, is not carried in the CFR.

#### APPENDIX D TO PART 229—CRITERIA FOR CERTIFICATION OF CRASHWORTHY EVENT RECORDER MEMORY MODULE

Section 229.135(b) requires that certain locomotives be equipped with an event recorder that includes a certified crashworthy event recorder memory module. This appendix prescribes the requirements for certifying an event recorder memory module (ERMM) as crashworthy, including the performance criteria and test sequence for establishing the crashworthiness of the ERMM

as well as the marking of the event recorder containing the crashworthy ERMM.

##### A. GENERAL REQUIREMENTS

1. Each manufacturer that represents its ERMM as crashworthy shall, by marking it as specified in Section B of this appendix, certify that the ERMM meets the performance criteria contained in this appendix and that test verification data are available to a railroad or to FRA upon request.

2. The test verification data shall contain, at a minimum, all pertinent original data logs and documentation that the test sample preparation, test set up, test measuring devices and test procedures were performed by designated, qualified personnel using recognized and acceptable practices. Test verification data shall be retained by the manufacturer or its successor as long as the specific model of ERMM remains in service on any locomotive.

3. A crashworthy ERMM shall be marked by its manufacturer as specified in Section B of this appendix.

#### B. MARKING REQUIREMENTS

1. The outer surface of the event recorder containing a certified crashworthy ERMM shall be colored international orange. In addition, the outer surface shall be inscribed, on the surface allowing the most visible area, in black letters on an international orange background, using the largest type size that can be accommodated, with the words **CERTIFIED DOT CRASHWORTHY**, followed by the ERMM model number (or other such designation), and the name of the manufacturer of the event recorder. This information may be displayed as follows:

##### CERTIFIED DOT CRASHWORTHY

Event Recorder Memory Module Model Number

Manufacturer's Name

Marking “**CERTIFIED DOT CRASHWORTHY**” on an event recorder designed for installation in a railroad locomotive is the certification that all performance criteria contained in this appendix have been met and all functions performed by, or on behalf of, the manufacturer whose name appears as

part of the marking, conform to the requirements specified in this appendix.

2. Retro-reflective material shall be applied to the edges of each visible external surface of an event recorder containing a certified crashworthy ERMM.

#### C. PERFORMANCE CRITERIA FOR THE ERMM

An ERMM is crashworthy if it has been successfully tested for survival under conditions of fire, impact shock, static crush, fluid immersion, and hydro-static pressure contained in one of the two tables shown in this section of appendix D. (See Tables 1 and 2.) Each ERMM must meet the individual performance criteria in the sequence established in Section D of this appendix. A performance criterion is deemed to be met if, after undergoing a test established in this appendix D for that criterion, the ERMM has preserved all of the data stored in it. The data set stored in the ERMM to be tested shall include all the recording elements required by §229.135(b). The following tables describe alternative performance criteria that may be used when testing an ERMM's crashworthiness. A manufacturer may utilize either table during its testing but may not combine the criteria contained in the two tables.

TABLE 1—ACCEPTABLE PERFORMANCE CRITERIA—OPTION A

| Parameter                    | Value  | Duration  | Remarks   |
|------------------------------|--|---|---|
| Fire, High Temperature ..... | 750 °C (1400 °F) .....   | 60 minutes .....                                  | Heat source: Oven.  |
| Fire, Low Temperature .....  | 260 °C (500 °F) .....  | 10 hours .....                                    |   |
| Impact Shock .....           | 55g .....  | 100 ms .....                                      | ½ sine crash pulse.   |
| Static Crush .....           | 110kN (25,000 lbf) .....   | 5 minutes .....                                   |   |
| Fluid Immersion .....        | #1 Diesel, #2 Diesel, Water, Salt Water, Lube Oil. Fire Fighting Fluid ..... | Any single fluid, 48 hours.                       |   |
| .....                        | .....  | 10 minutes, following immersion above.            | Immersion followed by 48 hours in a dry location without further disturbance. |
| Hydrostatic Pressure .....   | Depth equivalent = 15 m. (50 ft.).   | 48 hours at nominal temperature of 25 °C (77 °F). |   |

TABLE 2—ACCEPTABLE PERFORMANCE CRITERIA—OPTION B

| Parameter                    | Value   | Duration  | Remarks                                    |
|------------------------------|---|---|--|
| Fire, High Temperature ..... | 1000 °C (1832 °F) .....   | 60 minutes .....                                  | Heat source: Open flame.                   |
| Fire, Low Temperature .....  | 260 °C (500 °F) .....   | 10 hours .....                                    | Heat source: Oven.                         |
| Impact Shock—Option 1 .....  | 23gs .....  | 250 ms .....                                      |  |
| Impact Shock—Option 2 .....  | 55gs .....  | 100 ms .....                                      | ½ sine crash pulse.                        |
| Static Crush .....           | 111.2kN (25,000 lbf) .....  | 5 minutes .....                                   |  |
| .....                        | 44.5kN (10,000 lbf) .....   | (single “squeeze”) .....                          | Applied to 25% of surface of largest face. |
| Fluid Immersion .....        | #1 Diesel, #2 Diesel, Water, Salt Water, Lube Oil, Fire Fighting Fluid. | 48 hours each.                                    |  |
| Hydrostatic Pressure .....   | 46.62 psig (= 30.5 m. or 100 ft.).                                      | 48 hours at nominal temperature of 25 °C (77 °F). |  |

#### D. TESTING SEQUENCE

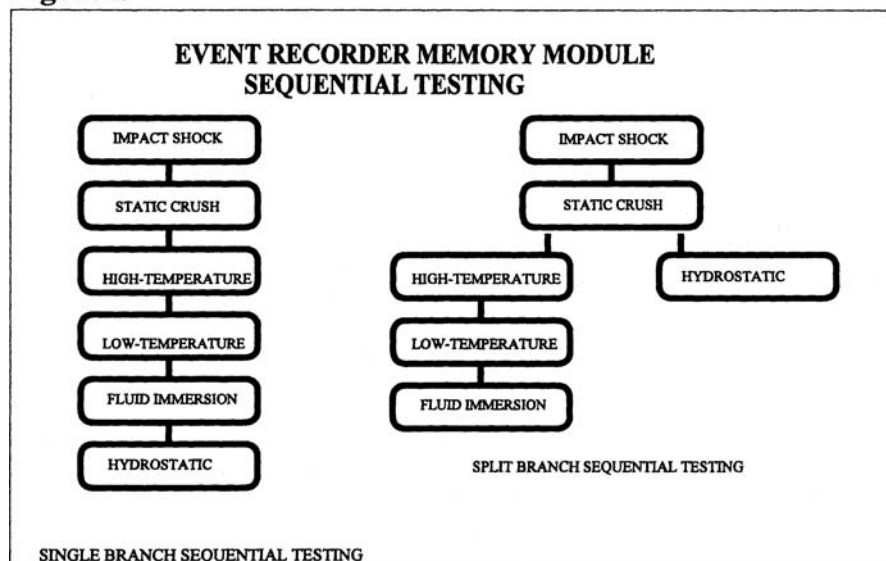
In order to reasonably duplicate the conditions an event recorder may encounter, the

ERMM shall meet the various performance criteria, described in Section C of this appendix, in a set sequence. (See Figure 1). If all

tests are done in the set sequence (single branch testing), the same ERMM must be utilized throughout. If a manufacturer opts for split branch testing, each branch of the test must be conducted using an ERMM of the same design type as used for the other

branch. Both alternatives are deemed equivalent, and the choice of single branch testing or split branch testing may be determined by the party representing that the ERMM meets the standard.

**Figure 1**



#### E. TESTING EXCEPTION

If a new model ERMM represents an evolution or upgrade from an older model ERMM that was previously tested and certified as meeting the performance criteria contained in Section C of this appendix, the new model ERMM need only be tested for compliance with those performance criteria contained in Section C of this appendix that are potentially affected by the upgrade or modification. FRA will consider a performance criterion not to be potentially affected if a preliminary engineering analysis or other pertinent data establishes that the modification or upgrade will not change the performance of the older model ERMM against the performance criterion in question. The manufacturer shall retain and make available to FRA upon request any analysis or data relied upon to satisfy the requirements of this paragraph to sustain an exception from testing.

[70 FR 37942, June 30, 2005]

#### APPENDIX E TO PART 229—PERFORMANCE CRITERIA FOR LOCOMOTIVE CRASH- WORTHINESS

This appendix provides performance criteria for the crashworthiness evaluation of alternative locomotive designs, and design standards for wide-nosed locomotives and any for other locomotive, except monocoque/semi-monocoque design locomotives and narrow-nose design locomotives. Each of the following criteria describes a collision scenario and a given performance measure for protection provided to cab occupants, normally through structural design. Demonstration that these performance criteria have been satisfied may be accomplished through any of the methods described in §229.205. This performance criteria is intended to prevent intrusion into the cab seating area occupied by crews. This excludes inner and outer vestibule areas.

(a) *Front end structure (collision posts)*—(1) *Objective.* The front end structure of the locomotive must withstand a frontal impact